KINDLY AMEND THE ABOVE-IDENTIFIED APPLICATION AS FOLLOWS:

In The Claims:

Please enter new claims 576-825 as follows:

576. An oligo- or polydeoxyribonucleotide which is complementary to a nucleic acid of interest or a portion thereof, said oligo- or polydeoxyribonucleotide comprising at least one modified nucleotide having the formula

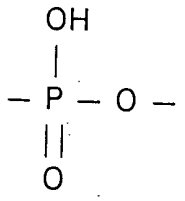
Sig—PM—SM—BASE

wherein PM is a phosphate moiety, SM is a sugar moiety and BASE is a base moiety selected from the group consisting of a pyrimidine, a purine and a deazapurine, or analog thereof, said PM being attached to SM, said BASE being attached to SM, and Sig being covalently attached to PM directly or through a chemical linkage, said Sig comprising a non-polypeptide, non-radioactive label moiety which can be directly or indirectly detected when attached to PM or when said modified nucleotide is incorporated into said oligo- or polydeoxyribonucleotide or when said oligo- or polydeoxyribonucleotide is hybridized to said complementary nucleic acid of interest or a portion thereof.

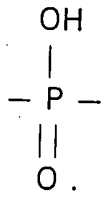
577. The oligo- or polydeoxyribonucleotide of claim 576, wherein said Sig is or renders the nucleotide or the oligo- or polydeoxyribonucleotide self-signaling or self-indicating or self-detecting.

2 1
578. The oligo- or polydeoxyribonucleotide of claim 576, wherein said Sig moiety comprises at least three carbon atoms.

3 1
579. The oligo- or polydeoxyribonucleotide of claim 576, wherein said covalent attachment is selected from the group consisting of



and

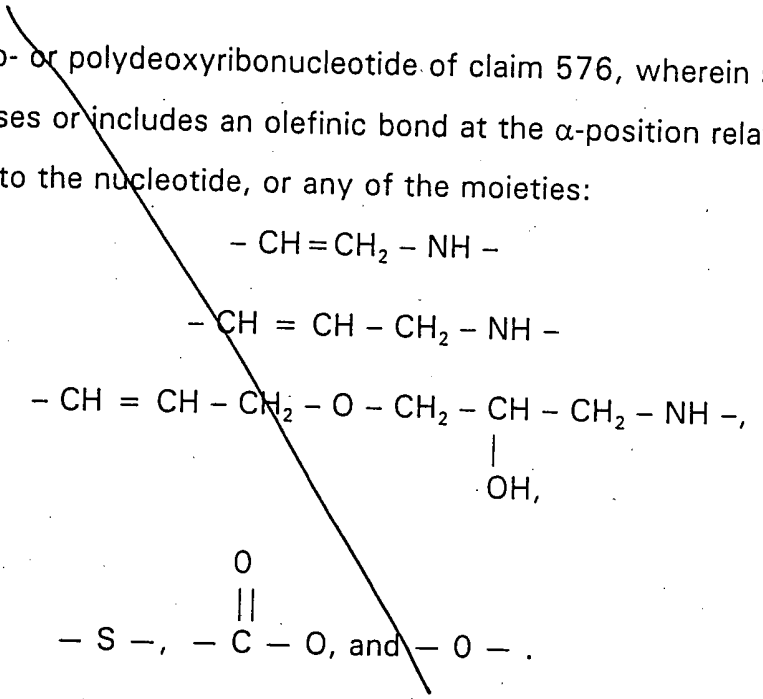


4 1
580. The oligo- or polydeoxyribonucleotide of claim 576, wherein said chemical linkage does not interfere substantially with the characteristic ability of Sig to form a detectable signal.

581. The oligo- or polydeoxyribonucleotide of claim 576, wherein said chemical linkage comprises a member selected from the group consisting of an olefinic bond at the α-position relative to the point of attachment to the nucleotide, a $-CH_2NH-$ moiety, or both.

6 1
582. The oligo- or polydeoxyribonucleotide of claim 576, wherein said chemical linkage comprises an allylamine group.

583. The oligo- or polydeoxyribonucleotide of claim 576, wherein said chemical linkage comprises or includes an olefinic bond at the α-position relative to the point of attachment to the nucleotide, or any of the moieties:



$$-CH=CH_2-NH-$$

$$-CH=CH-CH_2-NH-$$

$$-CH=CH-CH_2-O-CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_2-NH-,$$

$$-S-,\quad -\overset{\displaystyle O}{\overset{\|}{C}}-O,\text{ and}\quad -O-.$$

584. The oligo- or polydeoxyribonucleotide of claim 576, wherein said chemical linkage of Sig includes a glycosidic linkage moiety.

585. The oligo- or polydeoxyribonucleotide of claim 576, wherein said PM is monophosphate, a diphosphate or a triphosphate and said Sig moiety is covalently attached to said PM through a phosphorus atom or phosphate oxygen.

586. The oligo- or polydeoxyribonucleotide of claim 576, wherein Sig comprises a component selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, a metal-containing component, a fluorescent component, a chemiluminescent component, a chromogenic component or a combination of any of the foregoing.

587. The oligo- or polydeoxyribonucleotide of claim 586, wherein said electron dense component comprises ferritin.

12 ~~588~~. The oligo- or polydeoxyribonucleotide of claim 10 ~~586~~, wherein said magnetic component comprises magnetic oxide.

13 ~~589~~. The oligo- or polydeoxyribonucleotide of claim 12 ~~588~~, wherein said magnetic oxide comprises ferric oxide.

N' CON't.

14 ~~590~~. The oligo- or polydeoxyribonucleotide of claim 10 ~~586~~, wherein said metal-containing component is catalytic.

15 ~~591~~. The oligo- or polydeoxyribonucleotide of claim 10 ~~586~~, wherein said fluorescent component comprises a member selected from the group consisting of fluorescein, rhodamine and dansyl.

16 ~~592~~. The oligo- or polydeoxyribonucleotide of claim 1 ~~576~~, wherein said Sig moiety is attached to a terminal nucleotide in said oligo- or polydeoxyribonucleotide.

17 ~~593~~. The oligo- or polydeoxyribonucleotide of claim 16 ~~592~~, wherein the sugar moiety of said terminal nucleotide has a hydrogen atom at the 2' position thereof.

18 ~~594~~. The oligo- or polydeoxyribonucleotide of claim 16 ~~592~~, wherein the sugar moiety of said terminal nucleotide has oxygen atoms at each of the 2' and 3' positions thereof.

19 ~~595~~. The oligo- or polydeoxyribonucleotide of claim 1 ~~576~~, comprising at least one ribonucleotide.

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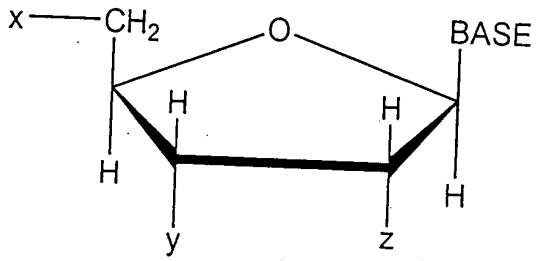
596. An oligo- or polydeoxyribonucleotide which is complementary to a nucleic acid of interest or a portion thereof, said oligo- or polydeoxyribonucleotide comprising at least one modified nucleotide having the structural formula:



N1 cont.

wherein BASE is a moiety selected from the group consisting of a pyrimidine, a purine and a deazapurine, or analog thereof, and wherein BASE is attached to the 1' position of the pentose ring from the N1 position when BASE is a pyrimidine or from the N9 position when BASE is a purine or a deazapurine;

wherein x is selected from the group consisting of H– , HO– , a mono-phosphate, a di-phosphate and a tri-phosphate;

wherein y is selected from the group consisting of H– , HO– , a mono-phosphate, a di-phosphate and a tri-phosphate;

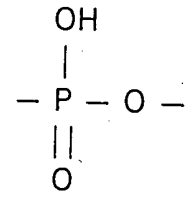
wherein z is selected from the group consisting of H– , HO– , a mono-phosphate, a di-phosphate and a tri-phosphate; and

wherein Sig is covalently attached directly or through a chemical linkage to at least one phosphate selected from the group consisting of x, y, z, and a combination thereof, said Sig comprising a non-polypeptide, non-radioactive label moiety which can be directly or indirectly detected when so attached to said phosphate or when said modified nucleotide is incorporated into said oligo- or polydeoxyribonucleotide or when said oligo- or polydeoxyribonucleotide is hybridized to said complementary nucleic acid of interest or a portion thereof.

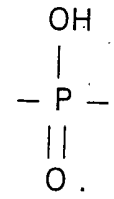
597. The oligo- or polydeoxyribonucleotide of claim 596, wherein said Sig is or renders the nucleotide or the oligo- or polydeoxyribonucleotde self-signaling or self-indicating or self-detecting.

598. The oligo- or polydeoxyribonucleotide of claim 596, wherein said Sig moiety comprises at least three carbon atoms.

599. The oligo- or polydeoxyribonucleotide of claim 596, wherein said covalent attachment is selected from the group consisting of



and



600. The oligo- or polydeoxyribonucleotide of claim 596, wherein said chemical linkage does not interfere substantially with the characteristic ability of Sig to form a detectable signal.

SUB 03

601. The oligo- or polydeoxyribonucleotide of claim 596, wherein said chemical linkage comprises a member selected from the group consisting of an olefinic bond at the α-position relative to the point of attachment to the nucleotide, a $-CH_2NH-$ moiety, or both.

25 ~~602.~~ 20 The oligo- or polydeoxyribonucleotide of claim ~~596~~, wherein said chemical linkage comprises an allylamine group.

N' cont.

603. The oligo- or polydeoxyribonucleotide of claim 596, wherein said chemical linkage comprises or includes an olefinic bond at the α-position relative to the point of attachment to x, y or z, or any of the moieties:

$$-CH=CH_2-NH-$$

$$-CH=CH-CH_2-NH-$$

SUB 04

$$-CH=CH-CH_2-O-CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_2-NH-,$$

$$-S-,\quad -\overset{\displaystyle O}{\overset{\|}{C}}-O,\text{ and }-O-.$$

27 ~~604.~~ 20 The oligo- or polydeoxyribonucleotide of claim ~~596~~, wherein said chemical linkage of Sig includes a glycosidic linkage moiety.

28 ~~605.~~ 20 The oligo- or polydeoxyribonucleotide of claim ~~596~~, wherein said x and y each comprise a member selected from the group consisting of a monophosphate, a diphosphate and a triphosphate and said Sig moiety is covalently attached to either or both of said x and y through a phosphorus atom or phosphate oyxgen.

29 606. The oligo- or polydeoxyribonucleotide of claim 20 596, wherein Sig comprises a component selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, a metal-containing component, a fluorescent component, a chemiluminescent component, a chromogenic component or a combination of any of the foregoing.

30 607. The oligo- or polydeoxyribonucleotide of claim 29 606, wherein said electron dense component comprises ferritin.

N 1 cont.

31 608. The oligo- or polydeoxyribonucleotide of claim 29 606, wherein said magnetic component comprises magnetic oxide.

32 609. The oligo- or polydeoxyribonucleotide of claim 31 608, wherein said magnetic oxide comprises ferric oxide.

33 610. The oligo- or polydeoxyribonucleotide of claim 29 606, wherein said metal-containing component is catalytic.

34 611. The oligo- or polydeoxyribonucleotide of claim 29 606, wherein said fluorescent component comprises a member selected from the group consisting of fluorescein, rhodamine and dansyl.

35 612. The oligo- or polydeoxyribonucleotide of claim 20 596, wherein said Sig moiety is attached to a terminal nucleotide in said oligo- or polydeoxyribonucleotide.

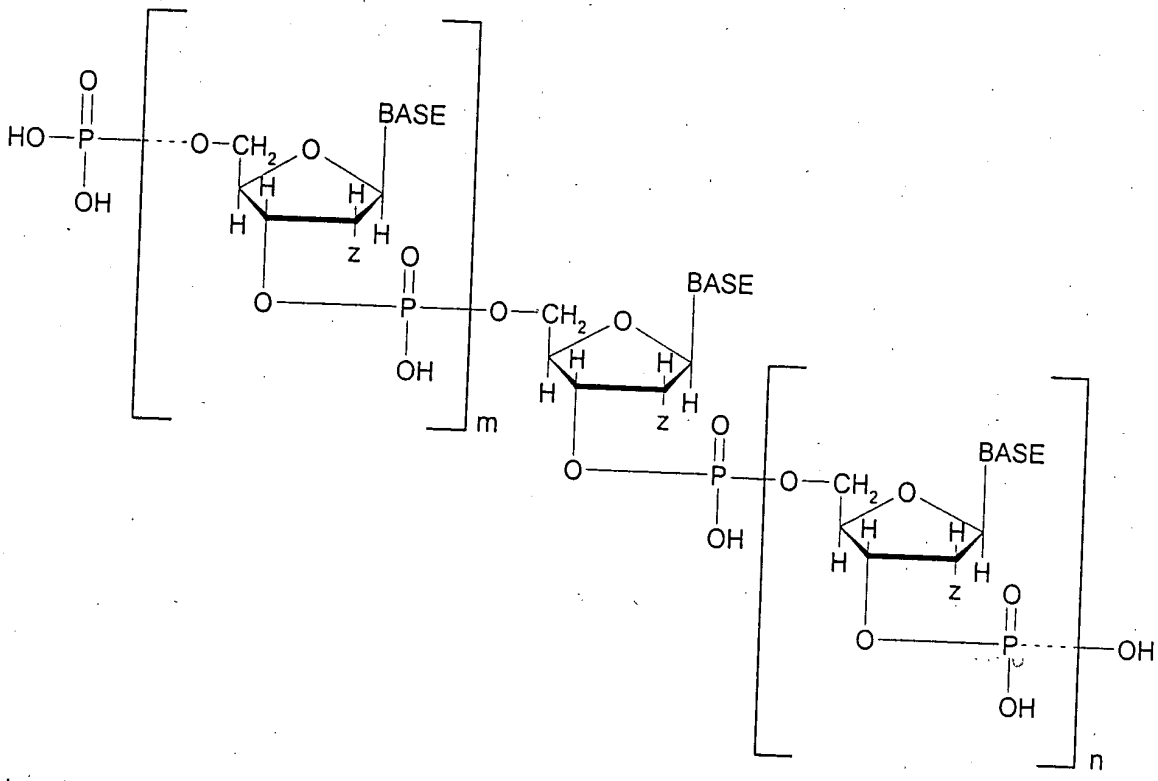
36 613. The oligo- or polydeoxyribonucleotide of claim 612, wherein z of said terminal nucleotide comprises a hydrogen atom at the 2' position thereof.

37 614. The oligo- or polydeoxyribonucleotide of claim 612, wherein both y and z of said terminal nucleotide comprise an oxygen atom at each of the 3' and 2' positions thereof, respectively.

N' CON't.

38 615. The oligo- or polydeoxyribonucleotide of claim 596, comprising at least one ribonucleotide.

39 616. The oligo- or polydexoyribonucleotide of claim 596, having the structural formula:



wherein m and n represent integers from 0 up to about 100,000, and wherein said Sig. moiety is attached to at least one of the phosphate moieties in said structural formula.

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617. An oligo- or polynucleotide which is complementary to a nucleic acid of interest or a portion thereof, said oligo- or polynucleotide comprising at least one modified nucleotide having the formula

Sig – PM – SM – BASE

N1 cont.

wherein PM is a phosphate moiety, SM is a sugar moiety and BASE is a moiety selected from the group consisting of a pyrimidine, a purine and a deazapurine, or analog thereof, said PM being attached to SM, said BASE being attached to SM, and Sig being covalently attached to PM directly or via a chemical linkage, said Sig comprising a non-polypeptide, non-radioactive label moiety which can be directly or indirectly detected when attached to PM or when said modified nucleotide is incorporated into said oligo- or polynucleotide, or when said oligo- or polynucleotide is hybridized to said complementary nucleic acid of interest or a portion thereof, provided that when said oligo- or polynucleotide is an oligoribonucleotide or a polyribonucleotide, and when Sig is attached through a chemical linkage to a terminal PM at the 3′ position of a terminal ribonucleotide, said chemical linkage is not obtained through a 2',3' vicinal oxidation of a 3′ terminal ribonucleotide previously attached to said oligoribonucleotide or polyribonucleotide.

618. The oligo- or polynucleotide of claim 617, wherein said Sig is or renders the nucleotide or the oligo- or polynucleotide self-signaling or self-indicating or self-detecting.

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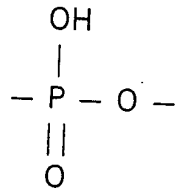
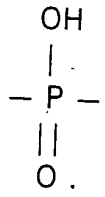
619. The oligo- or polynucleotide of claim 617, wherein said Sig moiety comprises at least three carbon atoms.

42 / 40

620. The oligo- or polynucleotide of claim 617, wherein said covalent attachment is selected from the group consisting of



and



N' cost.

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621. The oligo- or polynucleotide of claim 617, wherein said chemical linkage does not interfere substantially with the characteristic ability of Sig to form a detectable signal.

SUB 05

622. The oligo- or polynucleotide of claim 617, wherein said chemical linkage comprises a member selected from the group consisting of an olefinic bond at the α-position relative to the point of attachment to the nucleotide, a $-CH_2NH-$ moiety, or both.

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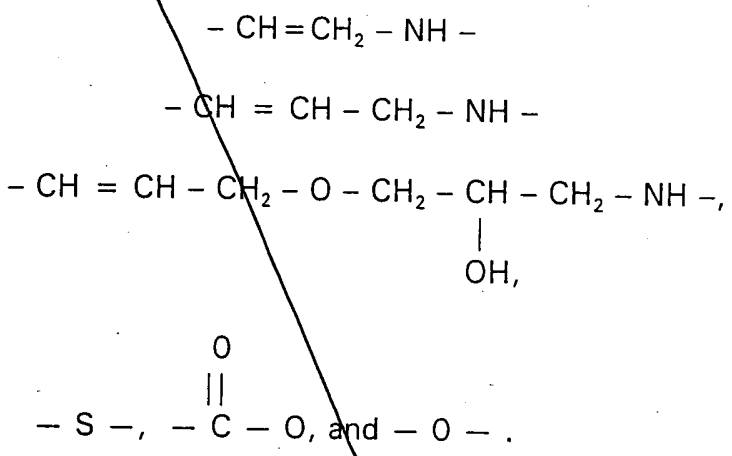
623. The oligo- or polynucleotide of claim 617, wherein said chemical linkage comprises an allylamine group.

624. The oligo- or polynucleotide of claim 617, wherein said chemical linkage comprises or includes an olefinic bond at the α-position relative to the point of attachment to the nucleotide, or any of the moieties:



625. The oligo- or polynucleotide of claim 617, wherein said chemical linkage of Sig includes a glycosidic linkage moiety.

626. The oligo- or polynucleotide of claim 617, wherein said PM is a monophosphate, a diphosphate or a triphosphate and said Sig moiety is covalently attached to said PM through a phosphorus atom or a phosphate oxygen.

627. The oligo- or polynucleotide of claim 617, wherein Sig comprises a component selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, a metal-containing component, a fluorescent component, a chemiluminescent component, a chromogenic component or a combination of any of the foregoing.

50 ~~628~~. The oligo- or polynucleotide of claim ~~627~~ 49, wherein said electron dense component comprises ferritin.

51 ~~629~~. The oligo- or polynucleotide of claim ~~627~~ 49, wherein said magnetic component comprises magnetic oxide.

52 ~~630~~. The oligo- or polynucleotide of claim ~~629~~ 51, wherein said magnetic oxide comprises ferric oxide.

N' Cont. 53 ~~631~~. The oligo- or polynucleotide of claim ~~627~~ 49, wherein said metal-containing component is catalytic.

54 ~~632~~. The oligo- or polynucleotide of claim ~~627~~ 49, wherein said fluorescent component comprises a member selected from the group consisting of fluorescein, rhodamine and dansyl.

55 ~~633~~. The oligo- or polynucleotide of claim ~~617~~ 40, wherein said Sig moiety is attached to a terminal nucleotide in said oligo- or polynucleotide.

56 ~~634~~. The oligo- or polynucleotide of claim ~~633~~ 55, wherein the sugar moiety of said terminal nucleotide has a hydrogen atom at the 2' position thereof.

57 ~~635~~. The oligo- or polynucleotide of claim ~~633~~ 55, wherein the sugar moiety of said terminal nucleotide has an oxygen atom at each of the 2' and 3' positions thereof.

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636. The oligo- or polynucleotide of claim 617, comprising at least one deoxyribonucleotide.

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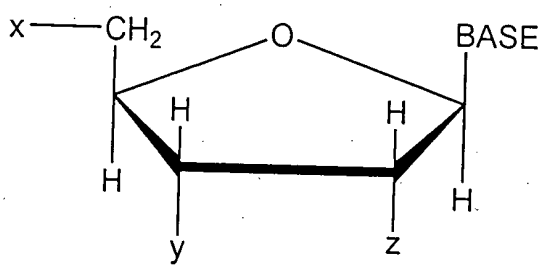
637. An oligo- or polynucleotide which is complementary to a nucleic acid of interest or a portion thereof, said oligo- or polynucleotide comprising at least one modified nucleotide having the structural formula:



N' cont.

wherein BASE is a moiety selected from the group consisting of a pyrimidine, a purine and a deazapurine, or analog thereof, and wherein BASE is attached to the 1' position of the pentose ring from the N1 position when BASE is a pyrimidine or from the N9 position when BASE is a purine or a deazapurine;

wherein x is selected from the group consisting of H– , HO– , a mono-phosphate, a di-phosphate and a tri-phosphate;

wherein y is selected from the group consisting of H– , HO– , a mono-phosphate, a di-phosphate and a tri-phosphate;

wherein z is selected from the group consisting of H– , HO– , a mono-phosphate, a di-phosphate and a tri-phosphate; and

wherein Sig is covalently attached directly or through a chemical linkage to at least one phosphate selected from the group consisting of x, y and z, and a combination thereof, said Sig comprising a non-polypeptide, non-radioactive label moiety which can be directly or indirectly detected when so attached to said

phosphate or when said modified nucleotide is incorporated into said oligo- or polynucleotide, or when said oligo- or polynucleotide is hybridized to said complementary nucleic acid of interest or a portion thereof, provided that when said oligo- or polynucleotide is an oligoribonucleotide or a polyribonucleotide and when Sig is attached through a chemical linkage to a terminal PM at the 3' position of a terminal ribonucleotide, said chemical linkage is not obtained through a 2',3' vicinal oxidation of a 3' terminal ribonucleotide previously attached to said oligoribonucleotide or polyribonucleotide.

N1 CON't.

638. The oligo- or polynucleotide of claim 637, wherein said Sig is or renders the nucleotide or the oligo- or polynucleotide self-signaling or self-indicating or self-detecting.

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~~639~~. The oligo- or polynucleotide of claim ~~637~~, wherein said Sig moiety comprises at least three carbon atoms.

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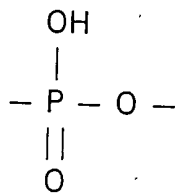
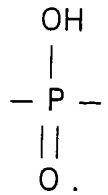
~~640~~. The oligo- or polynucleotide of claim ~~637~~, wherein said covalent attachment is selected from the group consisting of



and



641. The oligo- or polynucleotide of claim 637, wherein said chemical linkage does not interfere substantially with the characteristic ability of Sig to form a detectable signal.

642. The oligo- or polynucleotide of claim 637, wherein said chemical linkage comprises a member selected from the group consisting of an olefinic bond at the α-position relative to the point of attachment to the nucleotide, a $-CH_2NH-$ moiety, or both.

643. The oligo- or polynucleotide of claim 637, wherein said chemical linkage comprises an allylamine group.

644. The oligo- or polynucleotide of claim 637, wherein said chemical linkage comprises or includes an olefinic bond at the α-position relative to x, y or z, or any of the moieties:

$$-CH=CH_2-NH-$$

$$-CH=CH-CH_2-NH-$$

$$-CH=CH-CH_2-O-CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_2-NH-,$$

$$-S-,\quad -\overset{\displaystyle O}{\overset{\|}{C}}-O,\text{ and}\quad -O-.$$

645. The oligo- or polynucleotide of claim 637, wherein said chemical linkage of Sig includes a glycosidic linkage moiety.

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646. The oligo- or polynucleotide of claim 59, wherein said x and y each comprise a member selected from the group consisting of a monophosphate, a diphosphate and a triphosphate and Sig moiety is covalently attached to either or both of said x and y through a phosphorus atom or a phosphate oxygen.

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647. The oligo- or polynucleotide of claim 59, wherein Sig comprises a component selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, a metal-containing component, a fluorescent component, a chemiluminescent component, a chromogenic component or a combination of any of the foregoing.

N'
cont.

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648. The oligo- or polynucleotide of claim 68, wherein said electron dense component comprises ferritin.

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649. The oligo- or polynucleotide of claim 68, wherein said magnetic component comprises magnetic oxide.

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650. The oligo- or polynucleotide of claim 70, wherein said magnetic oxide comprises ferric oxide.

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651. The oligo- or polynucleotide of claim 68, wherein said metal-containing component is catalytic.

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652. The oligo- or polynucleotide of claim 68, wherein said fluorescent component comprises a member selected from the group consisting of fluorescein, rhodamine and dansyl.

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653. The oligo- or polynucleotide of claim 637, wherein said Sig moiety is attached to a terminal nucleotide in said oligo- or polynucleotide.

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654. The oligo- or polynucleotide of claim 653, wherein z of said terminal nucleotide comprises a hydrogen atom at the 2' position thereof.

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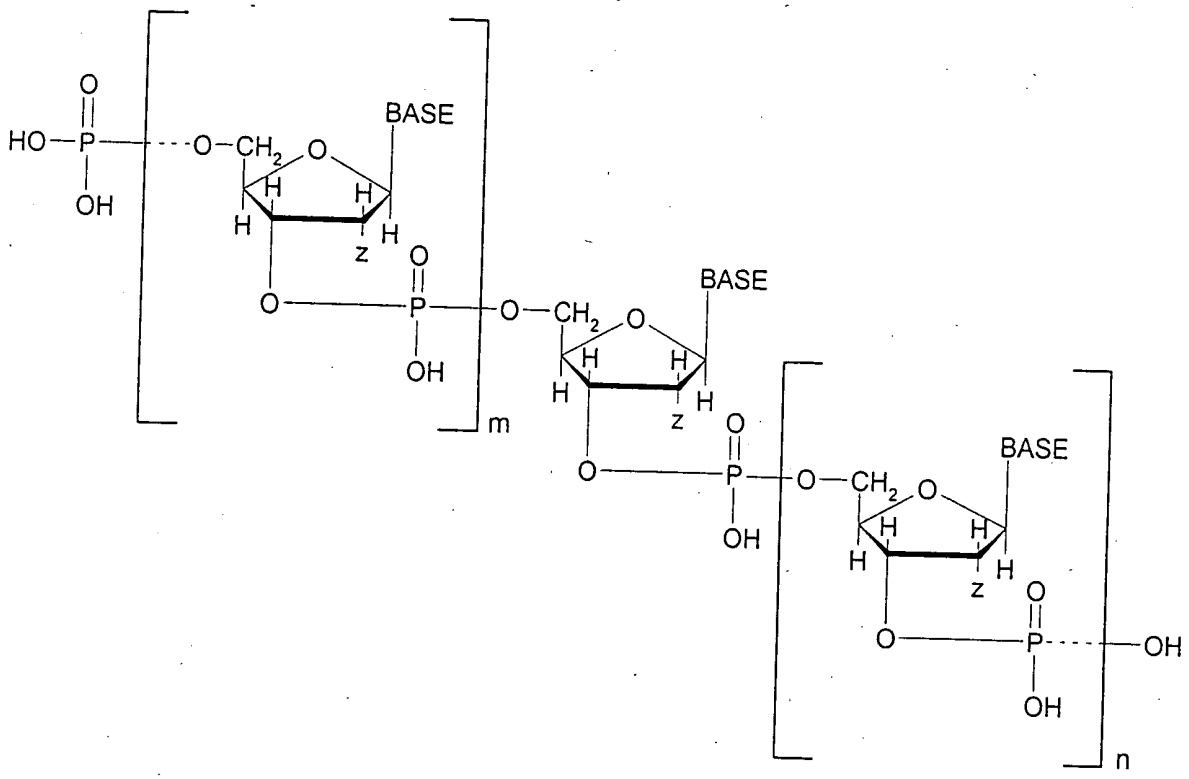
655. The oligo- or polynucleotide of claim 653, wherein both y and z of said terminal nucleotide comprise an oxygen atom at each of the 3' and 2' positions thereof, respectively.

77
656. The oligo- or polynucleotide of claim 637, comprising at least one deoxyribonucleotide.

78 ~~657~~. The oligo- or polynucleotide of claim ~~637~~ 59, having the structural formula:



wherein m and n represent integers from 0 up to about 100,000, and wherein said Sig moiety is attached to at least one of the phosphate moieties in said structural formula.

N' cont.

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658. An oligo- or polydeoxyribonucleotide which is complementary to a nucleic acid of interest or a portion thereof, said oligo- or polydeoxyribonucleotide comprising at least one modified nucleotide having the formula

Sig—PM—SM—BASE

wherein PM is a phosphate moiety, SM is a sugar moiety and BASE is a base moiety selected from the group consisting of a pyrimidine, a purine and a deazapurine, or analog thereof, said PM being attached to SM, said BASE being attached to SM, and Sig being covalently attached to PM directly or through a chemical linkage, said Sig comprising a non-radioactive label moiety which can be directly or indirectly detected when attached to PM or when said modified nucleotide is incorporated into said oligo- or polydeoxyribonucleotide or when said oligo- or polydeoxyribonucleotide is hybridized to said complementary nucleic acid of interest or a portion thereof, and wherein Sig comprises biotin, iminobiotin, an electron dense component, a magnetic component, a metal-containing component, a fluorescent component, a chemiluminescent component, a chromogenic component or a combination of any of the foregoing.

N' cont

659. The oligo- or polydeoxyribonucleotide of claim 658, wherein said Sig is or renders the nucleotide or the oligo- or polydeoxyribonucleotide self-signaling or self-indicating or self-detecting.

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660. The oligo- or polydeoxyribonucleotide of claim 658, wherein said Sig moiety comprises at least three carbon atoms.

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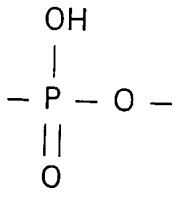
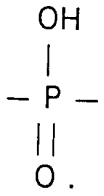
661. The oligo- or polydeoxyribonucleotide of claim 658, wherein said covalent attachment is selected from the group consisting of



and



N1 CON't

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662. The oligo- or polydeoxyribonucleotide of claim 658, wherein said chemical linkage does not interfere substantially with the characteristic ability of Sig to form a detectable signal.

SUB 09

663. The oligo- or polydeoxyribonucleotide of claim 658, wherein said chemical linkage comprises a member selected from the group consisting of an olefinic bond at the α-position relative to the point of attachment to the nucleotide, a $-CH_2NH-$ moiety, or both.

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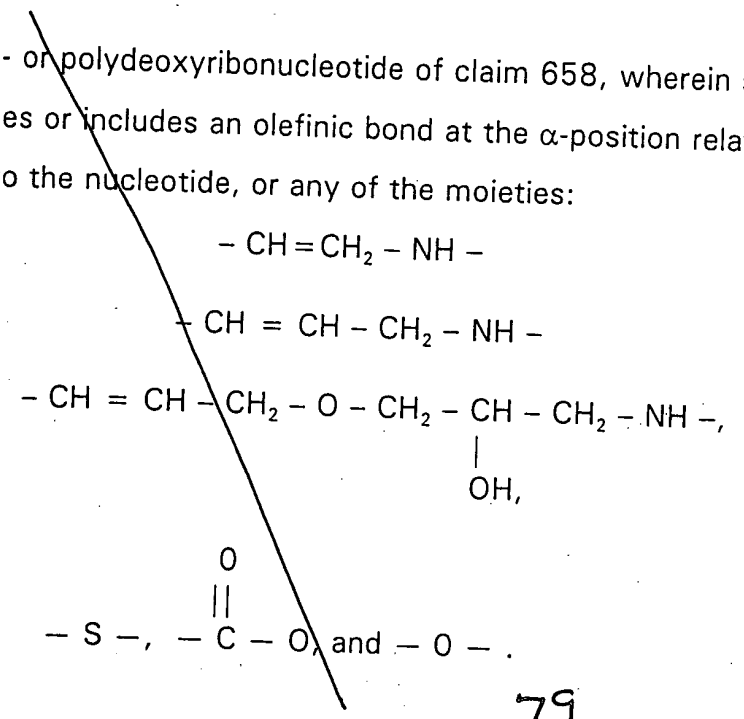
664. The oligo- or polydeoxyribonucleotide of claim 658, wherein said chemical linkage comprises an allylamine group.

SUB 610

665. The oligo- or polydeoxyribonucleotide of claim 658, wherein said chemical linkage comprises or includes an olefinic bond at the α-position relative to the point of attachment to the nucleotide, or any of the moieties:



$$-CH=CH_2-NH-$$

$$-CH=CH-CH_2-NH-$$

$$-CH=CH-CH_2-O-CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_2-NH-,$$

$$-S-,\quad -\overset{\displaystyle O}{\overset{\|}{C}}-O-\text{ and }-O-.$$

N1 cont.

666. The oligo- or polydeoxyribonucleotide of claim 658, wherein said chemical linkage of Sig includes a glycosidic linkage moiety.

667. The oligo- or polydeoxyribonucleotide of claim 658, wherein said PM is monophosphate, a diphosphate or a triphosphate and said Sig moiety is covalently attached to said PM through a phosphorus atom or phosphate oxygen.

668. The oligo- or polydeoxyribonucleotide of claim 658, wherein said electron dense component comprises ferritin.

669. The oligo- or polydeoxyribonucleotide of claim 658, wherein said magnetic component comprises magnetic oxide.

670. The oligo- or polydeoxyribonucleotide of claim 658, wherein said magnetic oxide comprises ferric oxide.

91 79
671. The oligo- or polydeoxyribonucleotide of claim 658, wherein said metal-containing component is catalytic.

92 79
672. The oligo- or polydeoxyribonucleotide of claim 658, wherein said fluorescent component comprises a member selected from the group consisting of fluorescein, rhodamine and dansyl.

93 79
673. The oligo- or polydeoxyribonucleotide of claim 658, wherein said Sig moiety is attached to a terminal nucleotide in said oligo- or polydeoxyribonucleotide.

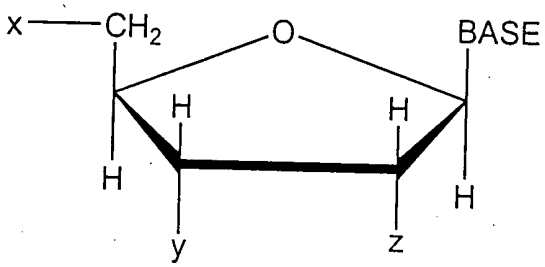
N' 94 93
CON't 674. The oligo- or polydeoxyribonucleotide of claim 673, wherein the sugar moiety of said terminal nucleotide has a hydrogen atom at the 2' position thereof.

95 93
675. The oligo- or polydeoxyribonucleotide of claim 673, wherein the sugar moiety of said terminal nucleotide has oxygen atoms at each of the 2' and 3' positions thereof.

96 79
676. The oligo- or polydeoxyribonucleotide of claim 658, comprising at least one ribonucleotide.

97

677. An oligo- or polydeoxyribonucleotide which is complementary to a nucleic acid of interest or a portion thereof, said oligo- or polydeoxyribonucleotide comprising at least one modified nucleotide having the structural formula:



N1 cont.

wherein BASE is a moiety selected from the group consisting of a pyrimidine, a purine and a deazapurine, or analog thereof, and wherein BASE is attached to the 1' position of the pentose ring from the N1 position when BASE is a pyrimidine or from the N9 position when BASE is a purine or a deazapurine;

wherein x is selected from the group consisting of H– , HO– , a mono-phosphate, a di-phosphate and a tri-phosphate;

wherein y is selected from the group consisting of H– , HO– , a mono-phosphate, a di-phosphate and a tri-phosphate;

wherein z is selected from the group consisting of H– , HO– , a mono-phosphate, a di-phosphate and a tri-phosphate; and

wherein Sig is covalently attached directly or through a chemical linkage to at least one phosphate selected from the group consisting of x, y, z, and a combination thereof, said Sig comprising a non-radioactive label moiety which can be directly or indirectly detected when so attached to said phosphate or when said modified nucleotide is incorporated into said oligo- or polydeoxyribonucleotide or when said oligo- or polydeoxyribonucleotide is hybridized to said complementary nucleic acid of interest or a portion thereof, wherein Sig comprises biotin,

iminobiotin, an electron dense component, a magnetic component, a metal-containing component, a fluorescent component, a chemiluminescent component, a chromogenic component or a combination of any of the foregoing.

678. The oligo- or polydeoxyribonucleotide of claim 677, wherein said Sig is or renders the nucleotide or the oligo- or polydeoxyribonucleotde self-signaling or self-indicating or self-detecting.

98

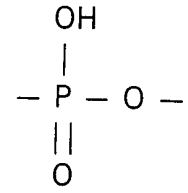
679. The oligo- or polydeoxyribonucleotide of claim 677, wherein said Sig moiety comprises at least three carbon atoms.

97

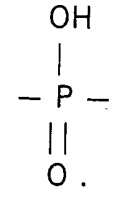
N' Cont.

99

680. The oligo- or polydeoxyribonucleotide of claim 677, wherein said covalent attachment is selected from the group consisting of



and



100

681. The oligo- or polydeoxyribonucleotide of claim 677, wherein said chemical linkage does not interfere substantially with the characteristic ability of Sig to form a detectable signal.

SUB D11

682. The oligo- or polydeoxyribonucleotide of claim 677, wherein said chemical linkage comprises a member selected from the group consisting of an olefinic bond at the α-position relative to the point of attachment to the nucleotide, a $-CH_2NH-$ moiety, or both.

102 97

683. The oligo- or polydeoxyribonucleotide of claim 677, wherein said chemical linkage comprises an allylamine group.

N' Cont.

684. The oligo- or polydeoxyribonucleotide of claim 677, wherein said chemical linkage comprises or includes an olefinic bond at the α-position relative to the point of attachment to x, y or z, or any of the moieties:

$$-CH=CH_2-NH-$$

$$-CH=CH-CH_2-NH-$$

SUB D12

$$-CH=CH-CH_2-O-CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_2-NH-,$$

$$-S-,\quad -\overset{\displaystyle O}{\overset{\|}{C}}-O,\text{ and }-O-.$$

104 97

685. The oligo- or polydeoxyribonucleotide of claim 677, wherein said chemical linkage of Sig includes a glycosidic linkage moiety.

105 97

686. The oligo- or polydeoxyribonucleotide of claim 677, wherein said x and y each comprise a member selected from the group consisting of a monophosphate, a diphosphate and a triphosphate and said Sig moiety is covalently attached to either or both of said x and y through a phosphorus atom or phosphate oyxgen.

106 687. The oligo- or polydeoxyribonucleotide of claim 677, wherein said electron dense component comprises ferritin.

107 688. The oligo- or polydeoxyribonucleotide of claim 677, wherein said magnetic component comprises magnetic oxide.

N1 CONT. 108 689. The oligo- or polydeoxyribonucleotide of claim 688, wherein said magnetic oxide comprises ferric oxide.

109 690. The oligo- or polydeoxyribonucleotide of claim 677, wherein said metal-containing component is catalytic.

110 691. The oligo- or polydeoxyribonucleotide of claim 677, wherein said fluorescent component comprises a member selected from the group consisting of fluorescein, rhodamine and dansyl.

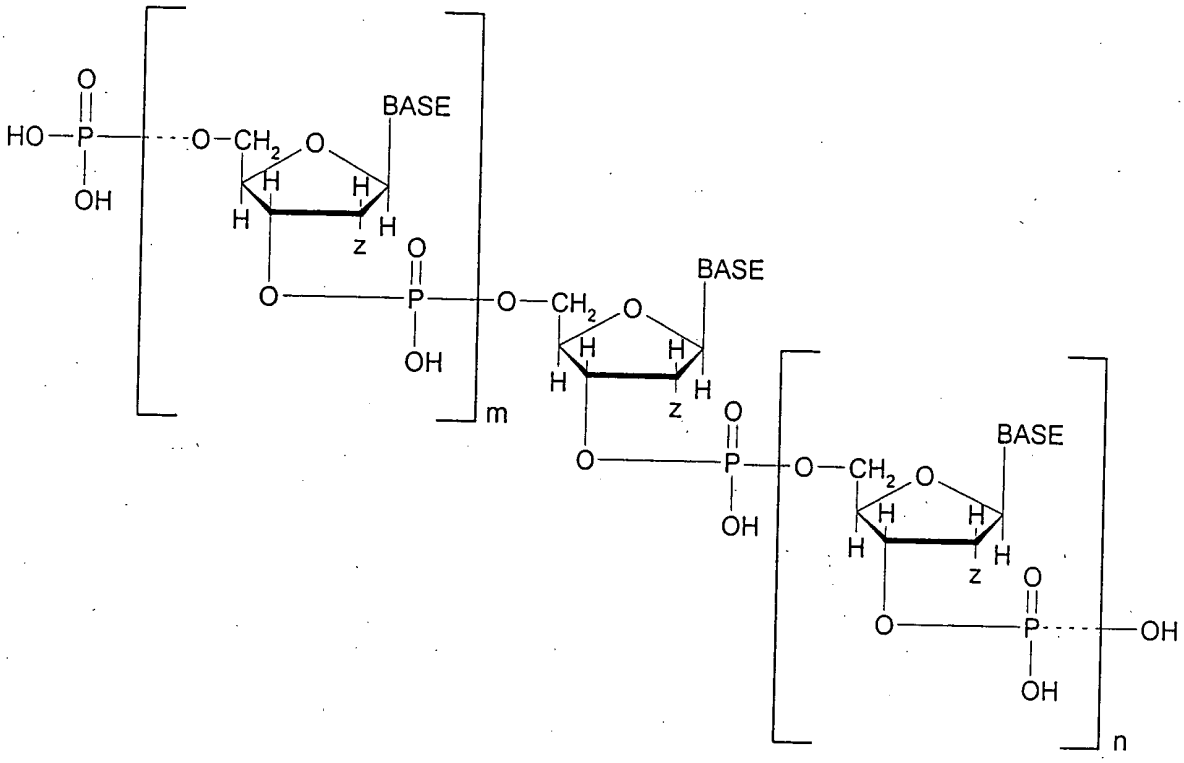
111 692. The oligo- or polydeoxyribonucleotide of claim 677, wherein said Sig moiety is attached to a terminal nucleotide in said oligo- or polydeoxyribonucleotide.

112 693. The oligo- or polydeoxyribonucleotide of claim 692, wherein z of said terminal nucleotide comprises a hydrogen atom at the 2' position thereof.

113 694. The oligo- or polydeoxyribonucleotide of claim 692, wherein both y and z of said terminal nucleotide comprise an oxygen atom at each of the 3' and 2' positions thereof, respectively.

114 695. The oligo- or polydeoxyribonucleotide of claim 677, comprising at least one ribonucleotide.

115 696. The oligo- or polydexoyribonucleotide of claim 677, having the structural formula:



wherein m and n represent integers from 0 up to about 100,000, and wherein said Sig moiety is attached to at least one of the phosphate moieties in said structural formula.

116

697. An oligo- or polynucleotide which is complementary to a nucleic acid of interest or a portion thereof, said oligo- or polynucleotide comprising at least one modified nucleotide having the formula

Sig – PM – SM – BASE

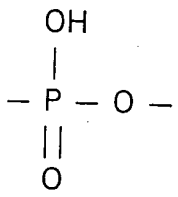
wherein PM is a phosphate moiety, SM is a sugar moiety and BASE is a moiety selected from the group consisting of a pyrimidine, a purine and a deazapurine, or analog thereof, said PM being attached to SM, said BASE being attached to SM, and Sig being covalently attached to PM directly or via a chemical linkage, said Sig comprising a non-radioactive label moiety which can be directly or indirectly detected when attached to PM or when said modified nucleotide is incorporated into said oligo- or polynucleotide, or when said oligo- or polynucleotide is hybridized to said complementary nucleic acid of interest or a portion thereof, provided that when said oligo- or polynucleotide is an oligoribonucleotide or a polyribonucleotide, and when Sig is attached through a chemical linkage to a terminal PM at the 3′ position of a terminal ribonucleotide, said chemical linkage is not obtained through a 2′,3′ vicinal oxidation of a 3′ terminal ribonucleotide previously attached to said oligoribonucleotide or polyribonucleotide, wherein Sig comprises biotin, iminobiotin, an electron dense component, a magnetic component, a metal-containing component, a fluorescent component, a chemiluminescent component, a chromogenic component or a combination of any of the foregoing.

N1 CON't.

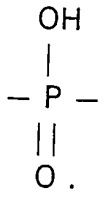
698. The oligo- or polynucleotide of claim 697, wherein said Sig is or renders the nucleotide or the oligo- or polynucleotide self-signaling or self-indicating or self-detecting.

117 699. The oligo- or polynucleotide of claim 116 697, wherein said Sig moiety comprises at least three carbon atoms.

118 700. The oligo- or polynucleotide of claim 116 697, wherein said covalent attachment is selected from the group consisting of



and



N' Cont.

119 701. The oligo- or polynucleotide of claim 116 697, wherein said chemical linkage does not interfere substantially with the characteristic ability of Sig to form a detectable signal.

SUB 013 702. The oligo- or polynucleotide of claim 697, wherein said chemical linkage comprises a member selected from the group consisting of an olefinic bond at the α-position relative to the point of attachment to the nucleotide, a $-CH_2NH-$ moiety, or both.

121 703. The oligo- or polynucleotide of claim 116 697, wherein said chemical linkage comprises an allylamine group.

704. The oligo- or polynucleotide of claim 697, wherein said chemical linkage comprises or includes an olefinic bond at the α-position relative to the point of attachment to the nucleotide, or any of the moieties:

$$-CH=CH_2-NH-$$

$$-CH=CH-CH_2-NH-$$

$$-CH=CH-CH_2-O-CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_2-NH-,$$

$$-S-,\quad -\overset{\displaystyle O}{\overset{\|}{C}}-O,\text{ and }-O-.$$

705. The oligo- or polynucleotide of claim 697, wherein said chemical linkage of Sig includes a glycosidic linkage moiety.

706. The oligo- or polynucleotide of claim 697, wherein said PM is a monophosphate, a diphosphate or a triphosphate and said Sig moiety is covalently attached to said PM through a phosphorus atom or a phosphate oxygen.

707. The oligo- or polynucleotide of claim 697, wherein said electron dense component comprises ferritin.

708. The oligo- or polynucleotide of claim 697, wherein said magnetic component comprises magnetic oxide.

127
709. The oligo- or polynucleotide of claim 126, wherein said magnetic oxide comprises ferric oxide.

128
710. The oligo- or polynucleotide of claim 116, wherein said metal-containing component is catalytic.

129
711. The oligo- or polynucleotide of claim 116, wherein said fluorescent component comprises a member selected from the group consisting of fluorescein, rhodamine and dansyl.

N1 CON't.

130
712. The oligo- or polynucleotide of claim 116, wherein said Sig moiety is attached to a terminal nucleotide in said oligo- or polynucleotide.

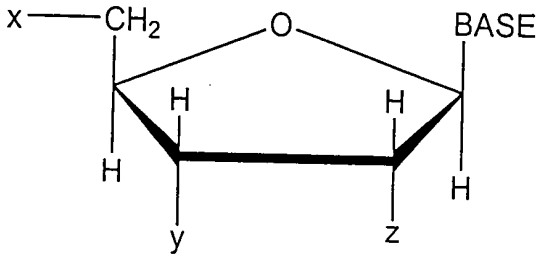
131
713. The oligo- or polynucleotide of claim 130, wherein the sugar moiety of said terminal nucleotide has a hydrogen atom at the 2' position thereof.

132
714. The oligo- or polynucleotide of claim 130, wherein the sugar moiety of said terminal nucleotide has an oxygen atom at each of the 2' and 3' positions thereof.

133
715. The oligo- or polynucleotide of claim 116, comprising at least one deoxyribonucleotide.

134

716. An oligo- or polynucleotide which is complementary to a nucleic acid of interest or a portion thereof, said oligo- or polynucleotide comprising at least one modified nucleotide having the structural formula:



N1 CONT.

wherein BASE is a moiety selected from the group consisting of a pyrimidine, a purine and a deazapurine, or analog thereof, and wherein BASE is attached to the 1' position of the pentose ring from the N1 position when BASE is a pyrimidine or from the N9 position when BASE is a purine or a deazapurine;

wherein x is selected from the group consisting of H— , HO— , a mono-phosphate, a di-phosphate and a tri-phosphate;

wherein y is selected from the group consisting of H— , HO— , a mono-phosphate, a di-phosphate and a tri-phosphate;

wherein z is selected from the group consisting of H— , HO— , a mono-phosphate, a di-phosphate and a tri-phosphate; and

wherein Sig is covalently attached directly or through a chemical linkage to at least one phosphate selected from the group consisting of x, y and z, and a combination thereof, said Sig comprising a non-radioactive label moiety which can be directly or indirectly detected when so attached to said phosphate or when said modified nucleotide is incorporated into said oligo- or polynucleotide, or when said oligo- or polynucleotide is hybridized to said complementary nucleic acid of interest or a portion thereof, provided that when said oligo- or polynucleotide is an

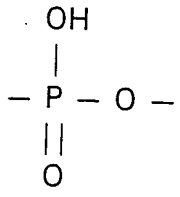
oligoribonucleotide or a polyribonucleotide and when Sig is attached through a chemical linkage to a terminal PM at the 3′ position of a terminal ribonucleotide, said chemical linkage is not obtained through a 2',3' vicinal oxidation of a 3′ terminal ribonucleotide previously attached to said oligoribonucleotide or polyribonucleotide, wherein Sig comprises biotin, iminobiotin, an electron dense component, a magnetic component, a metal-containing component, a fluorescent component, a chemiluminescent component, a chromogenic component or a combination of any of the foregoing.

N' cont.

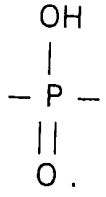
717. The oligo- or polynucleotide of claim 716, wherein said Sig is or renders the nucleotide or the oligo- or polynucleotide self-signaling or self-indicating or self-detecting.

135 718. The oligo- or polynucleotide of claim 134 716, wherein said Sig moiety comprises at least three carbon atoms.

136 719. The oligo- or polynucleotide of claim 134 716, wherein said covalent attachment is selected from the group consisting of



and



137

720. The oligo- or polynucleotide of claim 716, wherein said chemical linkage does not interfere substantially with the characteristic ability of Sig to form a detectable signal.

721. The oligo- or polynucleotide of claim 716, wherein said chemical linkage comprises a member selected from the group consisting of an olefinic bond at the α-position relative to the point of attachment to the nucleotide, a $-CH_2NH-$ moiety, or both.

722. The oligo- or polynucleotide of claim 716, wherein said chemical linkage comprises an allylamine group.

723. The oligo- or polynucleotide of claim 716, wherein said chemical linkage comprises or includes an olefinic bond at the α-position relative to x, y or z, or any of the moieties:

$$-CH=CH_2-NH-$$

$$-CH=CH-CH_2-NH-$$

$$-CH=CH-CH_2-O-CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_2-NH-,$$

$$-S-,\quad -\overset{\displaystyle O}{\overset{\|}{C}}-O,\text{ and}\quad -O-.$$

141

724. The oligo- or polynucleotide of claim 716, wherein said chemical linkage of Sig includes a glycosidic linkage moiety.

142
~~725~~. The oligo- or polynucleotide of claim 134, ~~716~~, wherein said x and y each comprise a member selected from the group consisting of a monophosphate, a diphosphate and a triphosphate and Sig moiety is covalently attached to either or both of said x and y through a phosphorus atom or a phosphate oxygen.

143
~~726~~. The oligo- or polynucleotide of claim 134, ~~716~~, wherein said electron dense component comprises ferritin.

N1 Cont.

144
~~727~~. The oligo- or polynucleotide of claim 134, ~~716~~, wherein said magnetic component comprises magnetic oxide.

145
~~728~~. The oligo- or polynucleotide of claim 144, ~~727~~, wherein said magnetic oxide comprises ferric oxide.

146
~~729~~. The oligo- or polynucleotide of claim 134, ~~716~~, wherein said metal-containing component is catalytic.

147
~~730~~. The oligo- or polynucleotide of claim 134, ~~716~~, wherein said fluorescent component comprises a member selected from the group consisting of fluorescein, rhodamine and dansyl.

148
~~731~~. The oligo- or polynucleotide of claim 134, ~~716~~, wherein said Sig moiety is attached to a terminal nucleotide in said oligo- or polynucleotide.

149
~~732~~. The oligo- or polynucleotide of claim 148, ~~731~~, wherein z of said terminal nucleotide comprises a hydrogen atom at the 2' position thereof.

150 148

733. The oligo- or polynucleotide of claim 731, wherein both y and z of said terminal nucleotide comprise an oxygen atom at each of the 3' and 2' positions thereof, respectively.

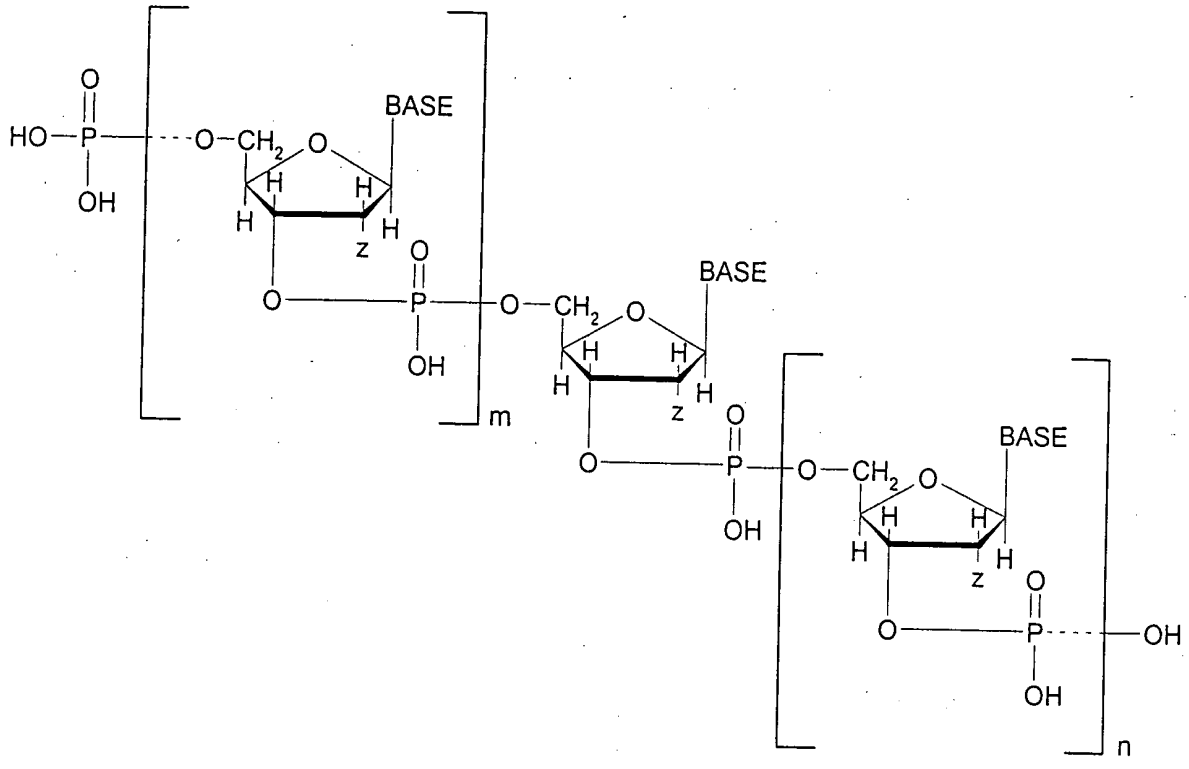
161 134

734. The oligo- or polynucleotide of claim 716, comprising at least one deoxyribonucleotide.

N1 cont.

152 134

735. The oligo- or polynucleotide of claim 716, having the structural formula:



wherein m and n represent integers from 0 up to about 100,000, and wherein said Sig moiety is attached to at least one of the phosphate moieties in said structural formula.

SUB 017

736. An oligo- or polydeoxyribonucleotide which is complementary to a nucleic acid of interest or a portion thereof, said oligo- or polydeoxyribonucleotide comprising at least one modified nucleotide having the formula

Sig—PM—SM—BASE

N' CON'T.

wherein PM is a phosphate moiety, SM is a sugar moiety and BASE is a base moiety selected from the group consisting of a pyrimidine, a purine and a deazapurine, or analog thereof, said PM being attached to SM, said BASE being attached to SM, and Sig being covalently attached to PM through a chemical linkage comprising a polypeptide or a protein, and said Sig comprising a non-radioactive label moiety which can be directly detected when indirectly attached to PM through said polypeptide or protein chemical linkage or when said modified nucleotide is incorporated into said oligo- or polydeoxyribonucleotide or when said oligo- or polydeoxyribonucleotide is hybridized to said complementary nucleic acid of interest or a portion thereof.

737. The oligo- or polydeoxyribonucleotide of claim 736, wherein said Sig is or renders the nucleotide or the oligo- or polydeoxyribonucleotide self-signaling or self-indicating or self-detecting.

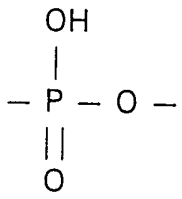
154

738. The oligo- or polydeoxyribonucleotide of claim 736, wherein said Sig moiety comprises at least three carbon atoms.

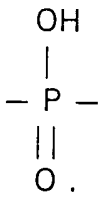
153

155

738. The oligo- or polydeoxyribonucleotide of claim 736, wherein said covalent attachment is selected from the group consisting of



and



740. The oligo- or polydeoxyribonucleotide of claim 736, wherein said polypeptide or protein chemical linkage does not interfere substantially with the characteristic ability of Sig to form a detectable signal.

741. The oligo- or polydeoxyribonucleotide of claim 736, wherein said PM is monophosphate, a diphosphate or a triphosphate and said Sig moiety is covalently attached via said polypeptide or protein chemical linkage to said PM through a phosphorus atom or phosphate oyxgen.

158

742. The oligo- or polydeoxyribonucleotide of claim 736, wherein Sig comprises a component selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, a metal-containing component, a fluorescent component, a chemiluminescent component, a chromogenic component or a combination of any of the foregoing.

159
~~743~~. The oligo- or polydeoxyribonucleotide of claim 158, wherein said electron dense component comprises ferritin.

160
~~744~~. The oligo- or polydeoxyribonucleotide of claim 158, wherein said magnetic component comprises magnetic oxide.

161
~~745~~. The oligo- or polydeoxyribonucleotide of claim 160, wherein said magnetic oxide comprises ferric oxide.

NI CON't.

162
~~746~~. The oligo- or polydeoxyribonucleotide of claim 158, wherein said metal-containing component is catalytic.

163
~~747~~. The oligo- or polydeoxyribonucleotide of claim 158, wherein said fluorescent component comprises a member selected from the group consisting of fluorescein, rhodamine and dansyl.

SUB 019

~~748~~. The oligo- or polydeoxyribonucleotide of claim 736, wherein said oligo- or polydeoxyribonucleotide is terminally ligated or attached to said polypeptide or protein chemical linkage.

165
~~749~~. The oligo- or polydeoxyribonucleotide of claim 153, wherein said polypeptide comprises polylysine.

166
~~750~~. The oligo- or polydeoxyribonucleotide of claim 153, wherein said polypeptide is selected from the group consisting of avidin, streptavidin and anti-hapten immunoglobulin.

SUB 020

751. The oligo- or polydeoxyribonucleotide of claim 736, wherein said Sig moiety is attached via said polypeptide or protein chemical linkage to a phosphate moiety in a terminal nucleotide in said oligo- or polydeoxyribonucleotide.

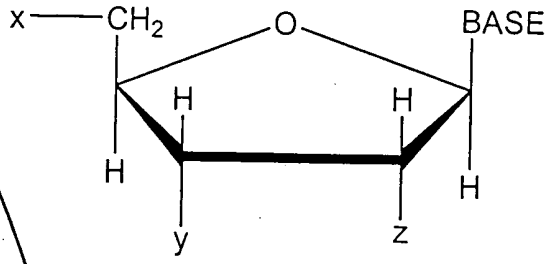
N1 CON't.

752. The oligo- or polydeoxyribonucleotide of claim 751, wherein the sugar moiety of said terminal nucleotide has a hydrogen atom at the 2' position thereof.

753. The oligo- or polydeoxyribonucleotide of claim 751, wherein the sugar moiety of said terminal nucleotide has oxygen atoms at each of the 2' and 3' positions thereof.

754. The oligo- or polydeoxyribonucleotide of claim 736, comprising at least one ribonucleotide.

755. An oligo- or polydeoxyribonucleotide which is complementary to a nucleic acid of interest or a portion thereof, said oligo- or polydeoxyribonucleotide comprising at least one modified nucleotide having the structural formula:



wherein BASE is a moiety selected from the group consisting of a pyrimidine, a purine and a deazapurine, or analog thereof, and wherein BASE is attached to the 1' position of the pentose ring from the N1 position when BASE is a pyrimidine or from the N9 position when BASE is a purine or a deazapurine;

wherein x is selected from the group consisting of H– , HO– , a mono-phosphate, a di-phosphate and a tri-phosphate;

wherein y is selected from the group consisting of H– , HO– , a mono-phosphate, a di-phosphate and a tri-phosphate;

wherein z is selected from the group consisting of H– , HO– , a mono-phosphate, a di-phosphate and a tri-phosphate; and

wherein Sig is covalently attached through a chemical linkage to at least one phosphate selected from the group consisting of x, y, z, and a combination thereof, said chemical linkage comprising a polypeptide or a protein, and said Sig comprising a non-radioactive label moiety which can be directly or indirectly detected when attached to said phosphate via said polypeptide or protein chemical linkage or when said modified nucleotide is incorporated into said oligo- or polydeoxynucleotide or when said oligo- or polydeoxynucleotide is hybridized to said complementary nucleic acid of interest or a portion thereof.

756. The oligo- or polydeoxyribonucleotide of claim 755, wherein said Sig is or renders the modified nucleotide or the oligo- or polydeoxyribonucleotde self-signaling or self-indicating or self-detecting.

172

757. The oligo- or polydeoxyribonucleotide of claim 755, wherein said Sig moiety comprises at least three carbon atoms.

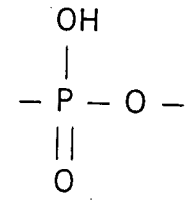
171

N1 CONT.

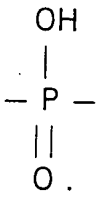
173

758. The oligo- or polydeoxyribonucleotide of claim 755, wherein said covalent attachment is selected from the group consisting of

171



and



SUB D22

759. The oligo- or polydeoxyribonucleotide of claim 755, wherein said polypeptide or protein chemical linkage does not interfere substantially with the characteristic ability of Sig to form a detectable signal.

SUB 022 CON't.

760. The oligo- or polydeoxyribonucleotide of claim 755, wherein said x and y each comprise a member selected from the group consisting of a monophosphate, a diphosphate and a triphosphate and said Sig moiety is covalently attached via said polypeptide or protein chemical linkage to either or both of said x and y a phosphorus atom or phosphate oyxgen.

N1 CON't.

176
761. The oligo- or polydeoxyribonucleotide of claim 755, wherein Sig comprises a component selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, a metal-containing component, a fluorescent component, a chemiluminescent component, a chromogenic component, or a combination of any of the foregoing.

177
762. The oligo- or polydeoxyribonucleotide of claim 176 761, wherein said electron dense component comprises ferritin.

178
763. The oligo- or polydeoxyribonucleotide of claim 176 761, wherein said magnetic component comprises magnetic oxide.

179
764. The oligo- or polydeoxyribonucleotide of claim 178 763, wherein said magnetic oxide comprises ferric oxide.

180
765. The oligo- or polydeoxyribonucleotide of claim 176 761, wherein said metal-containing component is catalytic.

181 766. The oligo- or polydeoxyribonucleotide of claim 176, wherein said fluorescent component comprises a member selected from the group consisting of fluorescein, rhodamine and dansyl.

SUB 023 767. The oligo- or polydeoxyribonucleotide of claim 755, wherein said oligo- or polydeoxyribonucleotide is terminally ligated or attached to said polypeptide or protein chemical linkage.

N1 Cont. 183 768. The composition of claim 171, wherein said polypeptide comprises polylysine.

184 769. The composition of claim 171, wherein said polypeptide is selected from the group consisting of avidin, streptavidin and anti-hapten immunoglobulin.

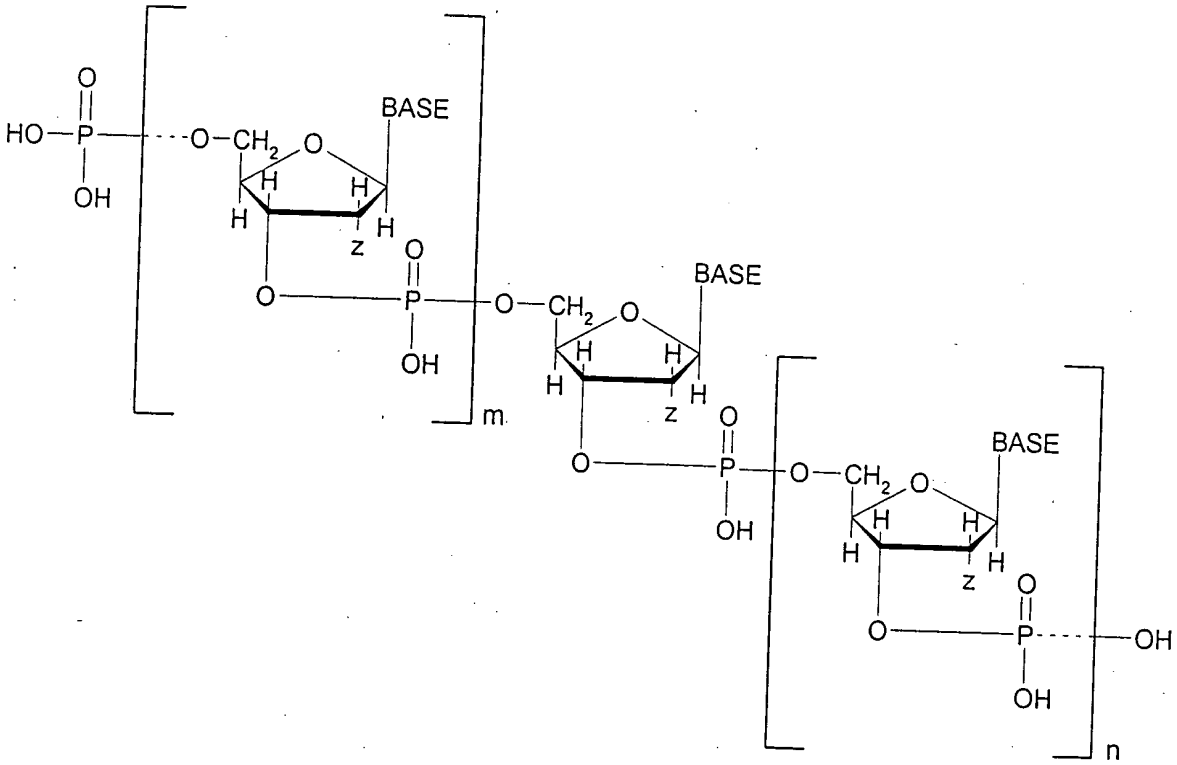
SUB 024 770. The oligo- or polydeoxyribonucleotide of claim 755, wherein said Sig moiety is attached via said polypeptide or protein chemical linkage to a terminal nucleotide in said oligo- or polydeoxyribonucleotide.

186 771. The oligo- or polydeoxyribonucleotide of claim 185, wherein z of said terminal nucleotide comprises a hydrogen atom at the 2' position thereof.

187 772. The oligo- or polydeoxyribonucleotide of claim 185, wherein both y and z of said terminal nucleotide comprise an oxygen atom at each of the 3' and 2' positions thereof, respectively.

188
773. The oligo- or polydeoxyribonucleotide of claim 171, comprising at least one ribonucleotide.

189
774. The oligo- or polydeoxyribonucleotide of claim 171, having the structural formula:



wherein m and n represent integers from 0 up to about 100,000, and wherein said Sig moiety is attached to at least one of the phosphate moieties in said structural formula.

775. An oligo- or polynucleotide which is complementary to a nucleic acid of interest or a portion thereof, said oligo- or polynucleotide comprising at least one modified nucleotide having the formula

Sig – PM – SM – BASE

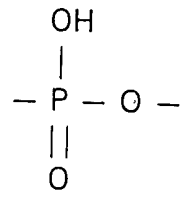
wherein PM is a phosphate moiety, SM is a sugar moiety and BASE is a moiety selected from the group consisting of a pyrimidine, a purine and a deazapurine, or analog thereof, said PM being attached to SM, said BASE being attached to SM, and Sig being covalently attached to PM via a chemical linkage comprising a polypeptide or a protein, said Sig comprising a non-radioactive label moiety which can be directly or indirectly detected when attached to PM via said polypeptide or protein chemical linkage or when said modified nucleotide is incorporated into said oligo- or polynucleotide, or when said oligo- or polynucleotide is hybridized to said complementary nucleic acid of interest or a portion thereof, provided that when said oligo- or polynucleotide is an oligoribonucleotide or a polyribonucleotide, and when Sig is attached through a chemical linkage to a terminal PM at the 3′ position of a terminal ribonucleotide, said chemical linkage is not obtained through a 2',3' vicinal oxidation of a 3′ terminal ribonucleotide previously attached to said oligoribonucleotide or polyribonucleotide.

776. The oligo- or polynucleotide of claim 775, wherein said Sig is or renders the nucleotide or the oligo- or polynucleotide self-signaling or self-indicating or self-detecting.

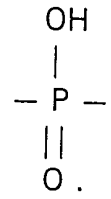
191 ~~777~~. The oligo- or polynucleotide of claim 190 ~~775~~, wherein said Sig moiety comprises at least three carbon atoms.

192 190

778. The oligo- or polynucleotide of claim 775, wherein said covalent attachment is selected from the group consisting of



and



N' CON

779. The oligo- or polynucleotide of claim 775, wherein said polypeptide or protein chemical linkage does not interfere substantially with the characteristic ability of Sig to form a detectable signal.

SUB 026

780. The oligo- or polynucleotide of claim 775, wherein said PM is a monophosphate, a diphosphate or a triphosphate and said Sig moiety is covalently attached via said polypeptide or protein chemical linkage to said PM through a phosphorus atom or a phosphate oxygen.

195 190

781. The oligo- or polynucleotide of claim 775, wherein Sig comprises a component selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, a metal-containing component, a fluorescent component, a chemiluminescent component, a chromogenic component or a combination of any of the foregoing.

196
~~782~~. The oligo- or polynucleotide of claim ~~781~~ 195, wherein said electron dense component comprises ferritin.

197
~~783~~. The oligo- or polynucleotide of claim ~~781~~ 195, wherein said magnetic component comprises magnetic oxide.

198
~~784~~. The oligo- or polynucleotide of claim ~~783~~ 197, wherein said magnetic oxide comprises ferric oxide.

N'1 cont.

199
~~785~~. The oligo- or polynucleotide of claim ~~781~~ 195, wherein said metal-containing component is catalytic.

200
~~786~~. The oligo- or polynucleotide of claim ~~781~~ 195, wherein said fluorescent component comprises a member selected from the group consisting of fluorescein, rhodamine and dansyl.

SUB 027

~~787~~. The oligo- or polynucleotide of claim 775, wherein said oligo- or polynucleotide is terminally ligated or attached to said polypeptide or protein chemical linkage.

202
~~788~~. The oligo- or polynucleotide of claim ~~775~~ 190, wherein said polypeptide comprises polylysine.

203
~~789~~. The oligo- or polynucleotide of claim ~~775~~ 190, wherein said polypeptide is selected from the group consisting of avidin, streptavidin and anti-hapten immunoglobulin.

SUB 028

790. The oligo- or polynucleotide of claim 775, wherein said Sig moiety is attached via said polypeptide or protein chemical linkage to a terminal nucleotide in said oligo- or polynucleotide.

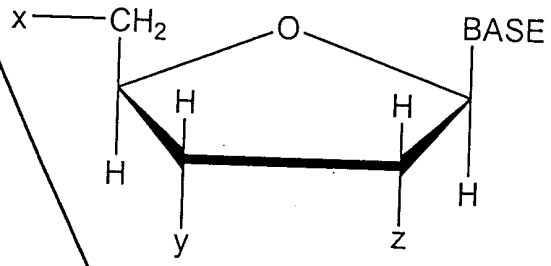
N1 CON't.

205 791. The oligo- or polynucleotide of claim 204 790, wherein the sugar moiety of said terminal nucleotide has a hydrogen atom at the 2' position thereof.

206 792. The oligo- or polynucleotide of claim 204 790, wherein the sugar moiety of said terminal nucleotide has an oxygen atom at each of the 2' and 3' positions thereof.

207 793. The oligo- or polynucleotide of claim 190 775, comprising at least one deoxyribonucleotide.

794. An oligo- or polynucleotide which is complementary to a nucleic acid of interest or a portion thereof, said oligo- or polynucleotide comprising at least one modified nucleotide having the structural formula:



wherein BASE is a moiety selected from the group consisting of a pyrimidine, a purine and a deazapurine, or analog thereof, and wherein BASE is attached to the 1' position of the pentose ring from the N1 position when BASE is a pyrimidine or from the N9 position when BASE is a purine or a deazapurine;

wherein x is selected from the group consisting of H– , HO– , a mono-phosphate, a di-phosphate and a tri-phosphate;

wherein y is selected from the group consisting of H– , HO– , a mono-phosphate, a di-phosphate and a tri-phosphate;

wherein z is selected from the group consisting of H– , HO– , a mono-phosphate, a di-phosphate and a tri-phosphate; and

wherein Sig is covalently attached through a chemical linkage to at least one phosphate selected from the group consisting of x, y and z, and a combination thereof, said chemical linkage comprising a polypeptide or a protein, and said Sig comprising a non-radioactive label moiety which can be directly detected when attached to said phosphate via said polypeptide or protein chemical linkage or when said modified nucleotide is incorporated into said oligo- or polynucleotide, or when said oligo- or polynucleotide is hybridized to said complementary nucleic acid of interest or a portion thereof, provided that when said oligo- or polynucleotide is an

SUB 029 cont.

oligoribonucleotide or a polyribonucleotide and when Sig is attached through a chemical linkage to a terminal PM at the 3′ position of a terminal ribonucleotide, said chemical linkage is not obtained through a 2′,3′ vicinal oxidation of a 3′ terminal ribonucleotide previously attached to said oligoribonucleotide or polyribonucleotide.

N1 cont.

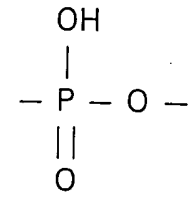
795. The oligo- or polynucleotide of claim 794, wherein said Sig is or renders the nucleotide or the oligo- or polynucleotide self-signaling or self-indicating or self-detecting.

209 208

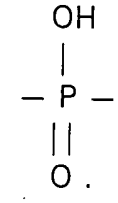
796. The oligo- or polynucleotide of claim 794, wherein said Sig moiety comprises at least three carbon atoms.

210 208

797. The oligo- or polynucleotide of claim 794, wherein said covalent attachment is selected from the group consisting of



and



SUB 030

798. The oligo- or polynucleotide of claim 794, wherein said polypeptide or protein chemical linkage does not interfere substantially with the characteristic ability of Sig to form a detectable signal.

SUB 030 CON't.

799. The oligo- or polynucleotide of claim 794, wherein said x and y each comprise a member selected from the group consisting of a monophosphate, a diphosphate and a triphosphate and Sig moiety is covalently attached to either or both of said x and y a phosphorus atom or a phosphate oxygen.

213 800. The oligo- or polynucleotide of claim 794, wherein Sig comprises a component selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, a metal-containing component, a fluorescent component, a chemiluminescent component, a chromogenic component or a combination of any of the foregoing.

N' CON't.

214 801. The oligo- or polynucleotide of claim 800, wherein said electron dense component comprises ferritin.

215 802. The oligo- or polynucleotide of claim 800, wherein said magnetic component comprises magnetic oxide.

216 803. The oligo- or polynucleotide of claim 802, wherein said magnetic oxide comprises ferric oxide.

217 804. The oligo- or polynucleotide of claim 800, wherein said metal-containing component is catalytic.

218 805. The oligo- or polynucleotide of claim 800, 213 wherein said fluorescent component comprises a member selected from the group consisting of fluorescein, rhodamine and dansyl.

SUB 031 806. The oligo- or polynucleotide of claim 794, wherein said oligo- or polynucleotide is terminally ligated or attached to said polypeptide or protein chemical linkage.

N' CON't. 220 807. The oligo- or polynucleotide of claim 794, 208 wherein said polypeptide comprises polylysine.

221 808. The oligo- or polynucleotide of claim 794, 208 wherein said polypeptide is selected from the group consisting of avidin, streptavidin and anti-hapten immunoglobulin.

SUB 032 809. The oligo- or polynucleotide of claim 794, wherein said Sig moiety is attached via said polypeptide or protein chemical linkage to a terminal nucleotide in said oligo- or polynucleotide.

223 810. The oligo- or polynucleotide of claim 222 809, wherein z of said terminal nucleotide comprises a hydrogen atom at the 2' position thereof.

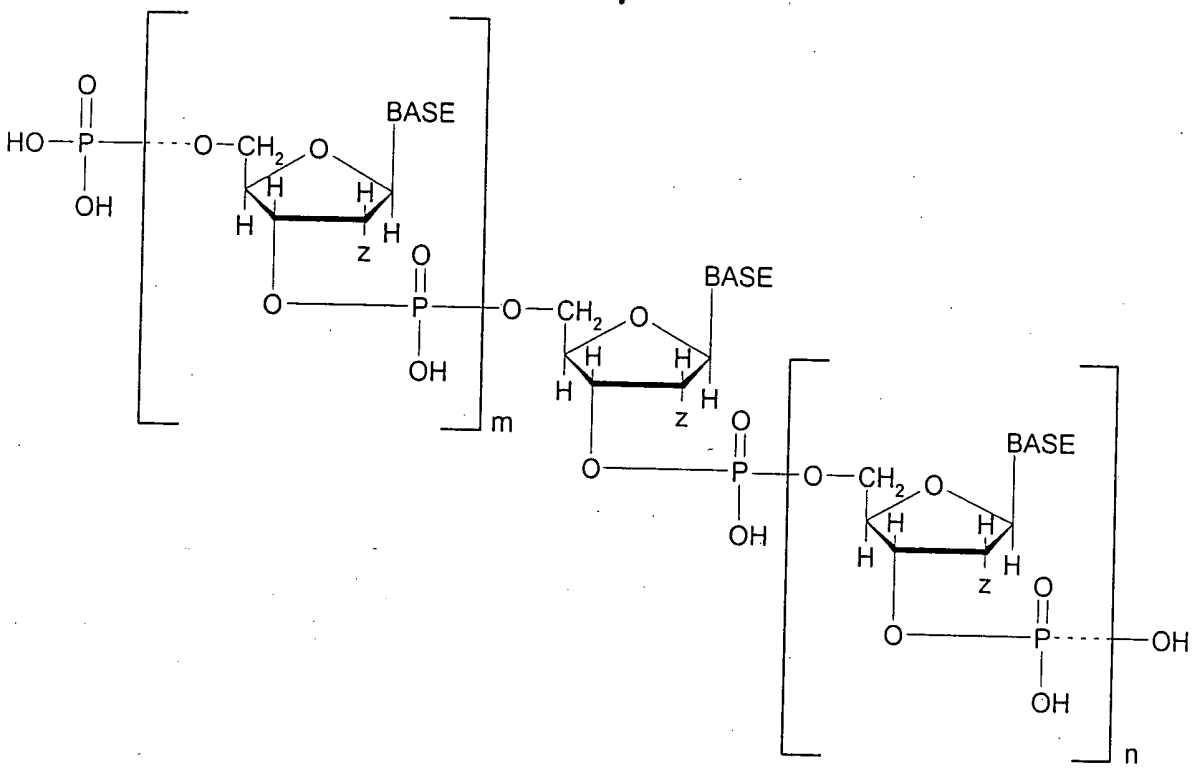
224 811. The oligo- or polynucleotide of claim 222 809, wherein both y and z of said terminal nucleotide comprise an oxygen atom at each of the 3' and 2' positions thereof, respectively.

225

~~812~~. The oligo- or polynucleotide of claim ~~794~~ 208, comprising at least one deoxyribonucleotide.

226

~~813~~. The oligo- or polynucleotide of claim ~~794~~ 208, having the structural formula:



wherein m and n represent integers from 0 up to about 100,000, and wherein said Sig moiety is attached to at least one of the phosphate moieties in said structural formula.

SUB 033

~~814~~. The oligo- or polydeoxyribonucleotide of claims 454 or 658, wherein said Sig is covalently attached to PM through a chemical linkage comprising a polypeptide or a protein.

228 227

~~815~~. The oligo- or polydeoxyribonucleotide of claim ~~814~~, wherein said polypeptide comprises polylysine.

SUB 034

816. The oligo- or polydeoxyribonucleotide of claim 814, wherein said polypeptide or protein is selected from the group consisting of avidin, streptavidin and anti-hapten immunoglobulin.

N' CON't

230 20 97

~~817~~. The oligo- or polydeoxyribonucleotide of claims ~~596~~ or ~~677~~, wherein said Sig is covalently attached to said at least one phosphate through a chemical linkage comprising a polypeptide or a protein.

231 230

~~818~~. The oligo- or polydeoxyribonucleotide of claim ~~817~~, wherein said polypeptide comprises polylysine.

SUB 035

~~819~~. The oligo- or polydeoxyribonucleotide of claim 817, wherein said polypeptide or protein is selected from the group consisting of avidin, streptavidin and anti-hapten immunoglobulin.

~~820~~. The oligo- or polynucleotide of claims 617 or 697, wherein said Sig is covalently attached to PM via a chemical linkage comprising a polypeptide or a protein.

234 233

~~821~~. The oligo- or polydeoxyribonucleotide of claim ~~820~~, wherein said polypeptide comprises polylysine.

SUB 036

822. The oligo- or polydeoxyribonucleotide of claim 820, wherein said polypeptide or protein is selected from the group consisting of avidin, streptavidin and anti-hapten immunoglobulin.

N' CON't.

823. The oligo- or polynucleotide of claims 637 or 716, wherein said Sig is covalently attached to said at least one phosphate through a chemical linkage comprising a polypeptide or a protein.

237 936

824. The oligo- or polydeoxyribonucleotide of claim 823, wherein said polypeptide comprises polylysine.

SUB 037

825. The oligo- or polydeoxyribonucleotide of claim 824, wherein said polypeptide or protein is selected from the group consisting of avidin, streptavidin and anti-hapten immunoglobulin.

Cancel claims 454-567.

* * * * * * *